NATURAL AND SOCIAL SELECTION

A 'Blue-Book' Analysis

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"CULTURE, extending to matters of hygiene," according to the Deputy Registrar-General,* is the all-important agency in relation to death-rates.

He continues, "The power of culture to exert a favourable influence upon mortality, even in the complete absence of wealth, is well illustrated in the case of the clergy. . . . Their mortality is remarkably low. Of 178 occupation groups dealt with in the recently-published report on occupational mortality in 1921-23, Anglican clergy occupied second place." But other factors are obviously at work in addition, since the report shows that the comparatively humble position of 90 is occupied by medical men—the admitted experts in matters of hygiene; whilst, in the same list, place 11 is taken by agricultural labourers, 27 by foremen at coal mines, 29 by bricklayers, 62 by coal hewers, 121 by barristers, 123 by above-ground colliery workers, 159 by undefined labourers, 165 by dock labourers, and 171 by costermongers and hawkers.

As it is claimed that occupation (males only, at ages 16-65) gives the surest guide to wealth, culture, and status, in a general way, social gradation on an occupational basis is adopted for the comparison of mortality. Every occupation distinguished in the census is assigned to one of five grades. They are: 1, Upper (Professional, etc.); 2, Intermediate (between 1 and 3); 3, Skilled Workmen; 4, Intermediate; and 5, Unskilled Labourers. Grades 1, 3, and 5 are clearly defined, doubtful cases being put in 2 and 4.

Though admitting that the classification is somewhat rough-and-ready and empirical, Dr. Stevenson says in evidence of its fundamental soundness, "The scheme yielded natality (1921) and mortality (1921-23) rates varying regularly with the social status, from a minimum for the highest class (1) to a maximum for the lowest (5). Taking the rate for all classes jointly as 100 in each case, natality (births per 1,000 married males under 55) varies as follows from Class 1 to Class 5: 70, 74, 101, 116, 127; and mortality as follows: 81, 94, 95, 101, 126."

BIOLOGICAL GRADING

The reader of this paper (and, indeed, of the *Decennial Supplement* also) is left to infer that different mortality rates are almost solely determined by the different environmental influences associated with, and corresponding to, the different occupations, and the groups into which they are gathered. But it seems to the present writer that the most essential factor, in the partial success of the classification, goes unrecognised. It is the underlying cause which has determined in the past, and which determines to-day, the actual personnel of the different occupations and social grades, that is of paramount importance. This cause is natural endowment—natural inheritance. And the reason why the five grades appear to have been built up upon the true lines is really because certain types of occupation, and certain degrees of wealth and culture, go *generally* (not always) hand-in-hand with corresponding degrees of natural endowment. Occupational grading, in fact, corresponds *roughly* with a grading in accordance with natural gifts. Consequently it happens that the higher grades contain (relatively to their total numbers) a much greater proportion of individuals of good inheritance, than do the lower. But every grade and occupation, of course, embraces an assortment; and this fact fully explains most of the anomalies exhibited in the Report.

* "Vital Statistics of Wealth and Poverty," T. H. C. Stevenson, C.B.E., M.D., in *Journal of the Royal Statistical Society*, Pt. 2, 1928, and the Registrar-General's *Decennial Supplement for England and Wales*, Pt. 2.

Despite the modifications in the struggle for existence wrought by advancing civilization, the best-adapted (the fittest) still tend to rise, and the less fit to fall. This is indisputable; it is evidenced on every hand. There is, therefore, a continual circulation taking place throughout society: some going up in the scale, others down, according to their natural gifts. The different employments in the series mark the milestones; the principal stages are represented by the social grades. The occupations (and the grades constructed from them) select their men. In a general way, the higher and more desirable the occupation, the better are the natural endowments of those who gain admission to it; and *vice versa*. For to suppose the converse—that the average casual labourer, for example, possesses natural equipment superior to the average skilled craftsman—is obviously to plunge into absurdity.

But once a man has reached the higher grades he is subject to the advantages of a beneficent cycle—good inheritance and good environment—all making for good. And there he and his descendants would assuredly remain, were it not for the occurrence of unfavourable variations, the mating of fitness with unfitness, and excesses in eating, in drinking, and *in Venere*. In class 5, on the other hand, a man encounters all the adversities of the vicious circle—bad inheritance, bad surroundings—all tending to his early destruction. But even so, this unfortunate type of person does not die out, because it is not only artificially preserved at the expense of the rest of society, but allowed freely to reproduce its kind!

OCCUPATIONAL SELECTION

For a confirmation of this view we have only to turn to the *Supplement*, which contains evidence in abundance. We will observe how an occupation selects its men according to their endowment, and how closely their rates of mortality correspond to their inheritance, *even in spite of unfavourable environment*. Let us examine the vital statistics of coal miners. The calling embraces a large number of men who are to a great extent segregated into colonies of their own; and the general standard of culture is practically the same for all—the hewers and others engaged below ground, as well as those employed above ground, all live together, side by side, lodging with each other, and so forth. As is well known, miners constitute a community of persons having singularly similar tastes, habits, and methods of life; their non-working environment is identical for all. But as workers they are divided broadly into three main groups, according to their natural gifts. The best-endowed are attracted to the occupation of hewing, which is much the most strenuous and exacting, but usually carries the highest remuneration. The two remaining occupations (i.e., other workers below, and workers above ground) are of a lighter character, and are shared by the less vigorous men. In each group there are vast numbers continually employed—the largest being that of hewers, which accounts for some 460,000 individuals between the ages of 20 and 65.

The vital statistics show that mortality falls much more lightly upon those whose work is hardest and whose environment is the least favourable, not only for one particular age group, but, generally speaking, for all. Let us quote from the *Supplement*. The mortality ratios at various ages are given as follows (included for comparison are corresponding figures for Anglican clergy, dock labourers, costermongers and hawkers):

Occupation	Ages 20-65	16—	20—	25—	35—	45—	55—
Hewers	93.8	86	84	91	88	84	105
Underground workers (not hewers)...	120.3	134	130	132	119	120	116
Workers above ground	118.3	156	149	133	125	112	112
Anglican Clergy ...	56.1	—	—	50	62	56	63
Dock Labourers ...	153.2	135	128	135	178	162	145
Costermongers and Hawkers ...	166.0	181	139	172	202	180	142

The relative mortalities of coal miners from all causes are here clearly shown; and when one furthermore bears in mind the fact that hewers have a much higher mortality at all ages from *accident* than the above-ground

workers, the part played by natural inheritance is strikingly manifested. Nothing else will explain these great differences. We must add that mortality rates for foremen in coalmining are lower still: the job of foreman exerting an even more severe selective action among competitors.

Again, the exceedingly high mortality rates (see table) for dock labourers and hawkers can only be accounted for as being in great part owing to their defective natural inheritance. Their occupational environment is not usually bad; much of their work is in the open air. But their remuneration is poor, their employment uncertain, and it is common knowledge that for these reasons their ranks are chiefly recruited from the constitutional derelicts of the large towns—improvidents, idlers, degenerates, 'unfits.' The same remarks apply to another large group, general undefined labourers. Here again we observe how the occupation selects the type, and how closely mortality corresponds to natural inheritance.

CLASS AND LONGEVITY

The following figures (from the *Supplement*) present the mortality ratios at various ages for the five occupational grades (males):

Social Grade	Ages 20-65	16—	20—	25—	35—	45—	55—	65—
1 Upper ...	81.2	57	67	65	76	85	87	94
2 Intermediate	94.2	83	87	94	92	94	96	99
3 Skilled ...	95.1	88	99	95	92	93	98	100
4 Intermediate	100.7	100	104	105	105	101	97	94
5 Unskilled ...	125.8	121	116	125	138	130	119	110

It is apparent from this table that as age increases mortality rates *tend* towards equality for all. This is clear evidence of the mixed character of each grade (and occupation) from the point of view of inheritance. In each, those of good endowment struggle successfully through the adversities of their respective environments, and tend to reach a very similar old age. But the constitutional weaklings, being far more numerous in the lower grades (relatively to total numbers), manifest their presence in the wide differences which are noticeable between grade-mortalities at the earlier ages.

One may fairly conclude that both environment and inheritance play their parts in determining mortality, but that by far the more important of the two is inheritance.

CHILD MORTALITY

A careful study of the official volumes* relating to the health of our nation leaves one with a feeling of disappointment and oppression.

As evidence of achievement we are told to observe the vital statistics of to-day, and compare them with those of the past. Attention is drawn to the fall in the general death-rate, and especially to the fall in infant mortality and in the death-rates of young children. We are informed that these figures speak for themselves of a better state of things. But do they? And are we to accept them, without question, as proof of a satisfactory bill of health?

As we have already seen, with *occupied adults* exposed to ordinarily strenuous or even unfavourable environments, a low mortality rate (as compared with others at the same period) is closely associated with a relatively good natural inheritance and fitness. Under tolerably hard general conditions, in fact, a comparatively low death-rate in any group of persons can be relied upon always to point to a sound endowment. But under much softened conditions (when food and State reliefs are broadcast, and institutional care and nurture easily obtained), a precisely similar (or even reduced) death-rate might well be compatible with a considerably lower average of inherited gifts. Accordingly, with infants, in particular, and with very young children, at different periods and under widely-different conditions, a falling death-rate may be altogether deceptive as indicative of an improvement in inherent healthfulness, since the life of a most wretchedly-endowed or even mortally-afflicted infant can be amazingly prolonged by a sedulous system of nursing and dietary.

* Annual Report of the Ministry of Health, 1926-1927; Annual Report of Chief Medical Officer of Ministry of Health, 1926; Annual Report of the London County Council, 1926.

For instance, during 1926 (the year especially under review) our general death-rate was 11.6 per thousand persons—the lowest yet recorded; and Sir George Newman (Chief Medical Officer, Ministry of Health), in his yearly report, makes the statement that " the expectation of life for a child born in this country to-day is not less than seventeen years longer than it was for a child born in 1846." The following table shows the decline in mortality which has actually taken place of late in each year up to five :

Period	Deaths per 1000 births	Deaths per 1000 survivors			
	Ages 0-1	1-2	2-3	3-4	4-5
1901-05	138	41	16	11	8
1926	70	18	8	5	4

The number of infants and young children, therefore, who are being saved to-day —at any rate for a while—is evident. But what is the *nature* of many of these children saved? In the majority of cases are they of the best stocks, or of the worst? The answer in view of the existing differential death and birth-rates is unfortunately only too obvious. They are, for the most part, physical and mental defectives who, under a sterner régime, would unquestionably have been eliminated soon after birth by natural selection. And, unhappily, the more of such we save the worse becomes the outlook for the State.

In England and Wales, during 1926, there were 453,804 deaths from all causes at all ages. Of these, 24,564 were from old age, 18,620 from violence, and the rest from disease of some kind. 173,131 of the deaths were of individuals under 50 years of age. In spite of an ample supply of food and its liberal distribution to all, in spite of all that is being done for the nation by preventive medicine (more than was ever done in the past), in spite of pensions, doles, reliefs, welfare centres, venereal centres, and charities of every description, a very large percentage of those born every year are of such enfeebled constitutions that they are totally unable to reach a reasonably advanced age.

There were also 53,220 deaths from cancer during 1926. In other words, of every 1,000 deaths from all causes, 117 were from cancer. The steady increase in mortality from this disease in recent times is exhibited in the following table, which shows the actual deaths per million of population at various periods :

Period.	Deaths.	Period.	Deaths.
1847-50	274	1921	1,215
1866-70	403	1924	1,297
1886-90	632	1926	1,362
1906-10	939		

These figures, of course, show only the number of fatal cases recorded. The actual incidence of this terrible affliction must be considerably greater, since cure by early operation has to be taken into account; and at no time was surgical intervention so widely practised as it is to-day. Part of the increase is clearly due to improved diagnosis, and part to the higher age of death—since cancer is a disease of middle age. But its hereditary nature is becoming more and more recognized; and, it must be asked, are we snatching lives from the ailments of infancy only to reserve them for a worse fate in later life, after they have transmitted the fatal tendency to their children?

THE TUBERCULAR BURDEN

Although the mortality from tuberculosis is declining (mainly due to the better general standard of nutrition of the nation), yet its cost is annually increasing. Hosts of new cases still appear, and the rate of decline is slower than it used to be.

The total number of sufferers from tuberculosis (as under notification, December, 1926) was 358,133 in England and Wales. The deaths for the year were 37,525. In England alone there were 442 dispensaries; 482 residential institutions with 22,202 beds; besides special schools, etc., devoted to the treatment of the disease.

The chronicity and incapacitating effects are well known; the after results of institutional treatment are still discouraging. Sir George Newman says, " The proportion of patients who have responded well to sanatorium treatment but who relapse within a comparatively short time after return to

ordinary conditions of life and work is unfortunately high."

That a very strong tendency to tuberculosis is hereditarily transmitted is notorious.

MENTAL DISABILITY

The following are the numbers of individuals who were *under care* for insanity on January 1st in certain recent years (England and Wales): 123,714 in 1922; 126,279 in 1923; 131,551 in 1925; and 133,883 in 1926. Also, 15,786 were *under care* for mental deficiency in 1923, and 19,376 in 1925.

But these figures greatly understate the real incidence of the mischief. Dr. Tredgold believes that there are more M.D.'s than insane in the country. He also says: "I think we shall be well within the mark in saying that the total number of persons suffering from certifiable mental disease in England and Wales is over 1 per cent., and perhaps nearer 2 per cent. of the general population." This would amount to considerably more than half a million individuals. In addition, however, to this vast figure he thinks that there is an even greater number of border-line cases (uncertifiable), epileptics, neurasthenics, and the like.

There is every reason to believe that all these conditions are becoming more and more widely disseminated by intermarriage. Dr. Tredgold further says: "An overwhelming proportion of cases of mental disease must be regarded as primarily due to innate and not to external causes." He estimates that about four-fifths of all cases of mental deficiency are hereditary in origin.

The death-roll from influenza has risen rapidly. The following table, in decennial periods since 1870, shows the average number of deaths per year in each period (England and Wales):

1871-80	1881-90	1891-1900	1901-10	1911-20
263	534	11,051	7,318	21,641

During the whole of the last period influenza accounted for nearly as many deaths as diphtheria, measles, scarlet fever, and whooping cough combined. In 1918 there were no fewer than 112,329 deaths from influenza. It is to be particularly noted that although all ages were attacked, yet the disease showed an especial ruthlessness to early adult life, a very high peak in the mortality occurring about age 30.

In view of these things the question naturally suggests itself—Are we rearing up to adult life a nation having a large percentage of highly vulnerable individuals with low general resisting powers, who, under the stress of slightly less favourable conditions, fall an easy prey to disease and perish prematurely by thousands?

THE BURDEN OF PAUPERISM

This table reveals the growing expenditure under the Poor Law:

Years ending March 31st		Total Annual Expenditure
1914		£15,055,863
1920		23,501,241
1924		37,882,282
1926		40,083,455
1927	(estimated)	49,500,000

The sharp rise in 1926-27 was, of course, due to industrial troubles. But the following remark of the Minister of Health is well worth bearing in mind, "It is not generally realised that during the past six years numbers of young men, without employment and maintained on Poor Law relief, have married, securing thereby an increase in their income from relief, and have had families, each addition to the family bringing its addition to the family income."

It must furthermore be remembered that huge and increasing sums are being paid out yearly in unemployment benefit, disablement benefit, widows' and orphans' and old age pensions. Thus:

Year.	Unemployment benefit.	Old Age Pension.
1924	£37,874,490	£23,800,000 (approx.)
1925	45,814,762	26,200,000 (approx.)
1926	50,201,758	27,800,000 (approx.)

This expenditure should cover the 'bad luck' cases and remove from the Poor Law all except the definitely defective. The National Health Insurance records show that during 1926 there was a loss of at least 28¼ million weeks' work owing to sickness, "or the equivalent of twelve months' work of upwards of 540,270 persons." "The total benefit payments under the scheme in 1926 for England and Wales, including medical

enefit charges, amounted to £28,584,000, nd in the same period the amount collected n contributions was £21,982,000, and the tate grant was £6,255,000." These figures ave been rising yearly.

Nearly 60 per cent. of the total insured ersons are under medical treatment every ear for varying lengths of time. Clearly here is a great deal of unfitness even mongst the picked workers of the nation.

Readers will remember that in 1917-18 he discovery was made that of 2,425,184 en of military age, only three in every ine were perfectly fit. Since the War, from o to 80 per cent. of those applying for rmy enlistment have been rejected as unfit; while it is significant that the height for dmission to the Guards regiments has been ncreasingly lowered of recent years. Again, 5 per cent. of those offering themselves for he Police Force are rejected.

In spite of 2,324 maternity and child elfare centres (in England alone costing early £2,000,000 per year), and of at least ,963 health visitors, and of day-nurseries nd the like, Sir George Newman tells us hat about 35 per cent. of children entering chool have physical defects of some kind.

During 1926 about 1,000 children (at age) from various parts of England were fficially examined in order to sample their eneral physical condition. In round figures, 9 per cent. showed signs of rickets, about 2 per cent. had enlarged tonsils, 10 per ent. enlarged tonsils and adenoids, 7 per ent. ear discharge, 24 per cent. dental ecay, 1½ per cent. cardiac affection, etc.

The next facts relate to London school ildren, who, for practical purposes, may e taken as typifying school children in neral. The following table shows the mber found (in 1926) at routine medical spection to require treatment for defects some sort (excluding uncleanliness and ntal disease):

Age Group.	Inspected.	Requiring Treatment.	Percentage Requiring Treatment.
ntrants (age 5)	74,948	12,975	17.3
ge 8	44,195	9,418	21.3
ge 12 ...	64,553	14,018	21.7
avers (age 13¾)	63,099	11,112	17.6

The fluctuation is peculiar, but reveals that the percentage of children requiring treatment instead of declining after entering school, seems rather to increase, despite a death-rate in some degree selective.

Of the entrants, 46 per cent. suffer from dental decay, 15 per cent. have severe caries, with septic gums. It is stated in the Report that " these figures show no diminution."

Of the first three groups 5.5 per cent. were referred for treatment for tonsils and adenoids; 5.2 per cent. for enlarged glands in the neck—an increase of recent years (says the Report).

Of 8-year-old children no less than 51.9 per cent. of the boys, and 54.7 per cent. of the girls failed to pass the test for normal vision.

Besides cases requiring treatment, many thousand others are marked as " requiring observation." Also, multitudes of instances of heart, lung, and nervous defects, as well as all kinds of deformities were brought to light during these routine inspections at the *ordinary elementary* schools.

But, it must be remembered, in estimating the total amount of unfitness in children, that there are now many special places for the reception of the more defective, schools for the blind and the partially blind, for the deaf and hard-of-hearing; open-air schools and camps; schools for the mentally defective; epileptic colonies; and so forth. Furthermore, there exist a certain number who are altogether unfit for any kind of school.

In an article in the *English Review* (March, 1927) Mr. Ludovici brought forward official statistics which demonstrated that, although general cleanliness and clothing had improved in school children, yet in recent years the percentage of A1 individuals (both boys and girls) was definitely declining, also that sickness (especially rheumatic and heart trouble, chorea and nervous disorders) had increased following the decline in infant mortality.

" The school medical service," says the London school medical officer (Dr. Menzies), " is a receiver of damaged goods and spends most of its time and energies in patching them up." But he appears to think that

the 'damage' takes place between birth and the age of going to school. Then why has the 'damage' increased during the years when pre-school care has improved?

THE INVISIBLE COST

That the cost of unfitness is each year rapidly increasing is evidenced on every hand. But the total amount cannot be precisely estimated, since some of it is borne by local authorities, some by State grants, and much again by voluntary aid. Besides actual expenditure, other factors have to be considered. Not only do the unfit require maintenance, but they are inefficient and unproductive—a dead loss to the State in every way. The labours of a great number of highly efficient persons needed for their care, are withdrawn from other purposes in consequence. This is true alike of paid State-officials, voluntary philanthropic workers, and relatives of 'unfits' in the home circle. Were it not for the existence of so many 'unproductives,' more fit individuals would unquestionably be born every year.

How long can any nation continue to bear the growing strain?

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